What is claimed is:

1.   A method for generating a 3D statistical shape model for a left ventricle of a heart comprises the steps of:

generating an average left ventricle by aligning the

5   datasets, selecting landmarks, and setting weights expressing confidence for each landmark; and

determining a statistical model from a set of aligned shape model by principle component analysis.

10   2.   A method for generating a 3D statistical shape model for a left ventricle of a heart comprises the steps of:

creating a template model;

aligning a plurality of left ventricle contour datasets;

assigning a plurality of landmarks to the datasets;

15   averaging the landmarks; and

determining a statistical model from a plurality of aligned shape models.

3.   The method of claim 2, wherein the step of creating the

20   template model further comprises the steps of:

determining a pose of the left ventricle according to a short axis and a lateral-to-septal-wall direction;

positioning a plurality of models in the dataset according to the pose;

25   fitting each model to a contour data, wherein the pose and a parametric component can change; and

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averaging the parametric component for each model to create the template model.

4. The method of claim 2, wherein the step of aligning further comprises the step of aligning the dataset to the template model.

5. The method of claim 4, wherein the step of aligning the dataset to the template model further comprises the steps of:

associating a plurality of individual contour points in each dataset with a corresponding model;

isotropically scaling each model to fit the template model; and

scaling the dataset to fit the template model.

6. The method of claim 2, wherein the step of assigning a plurality of landmarks to the datasets further comprises the step of associating model surfaces using the template model.

7. The method of claim 2, wherein the step of assigning landmarks further comprises the steps of:

fitting, completely, a model to each dataset; and

determining a point on each of a plurality of surfaces of the model which is closest to each of a plurality of nodes of the template model.

8.   The method of claim 7, wherein the nodes are points wherein at least three polygons comprising the template model meet.

5   9.   The method of claim 2, wherein averaging the landmarks further comprise the steps of:

determining a confidence of each landmark;

scoring each confidence; and

averaging the landmarks according to a membership

10   function of a scored value of the corresponding confidences.

10.   The method of claim 2, wherein the statistical model is determined according to a principle component analysis.

15   11.   A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for generating a 3D statistical shape model for a left ventricle of a heart, the method steps comprising:

20   creating a template model;

aligning a plurality of left ventricle contour datasets;

assigning a plurality of landmarks to the datasets;

averaging the landmarks; and

determining a statistical model from a plurality of

25   aligned shape models.

12. The method of claim 11, wherein the step of creating the template model further comprises the steps of:

determining a pose of the left ventricle according to a short axis and a lateral-to-septal-wall direction;

5   positioning a plurality of models in the dataset according to the pose;

fitting each model to a contour data, wherein the pose and a parametric component can change; and

averaging the parametric component for each model to 10   create the template model.

13. The method of claim 11, wherein the step of aligning further comprises the step of aligning the dataset to the template model.

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14. The method of claim 13, wherein the step of aligning the dataset to the template model further comprises the steps of:

associating a plurality of individual contour points in each dataset with a corresponding model;

20   isotropically scaling each model to fit the template model; and

scaling the dataset to fit the template model.

15. The method of claim 11, wherein the step of assigning a 25 plurality of landmarks to the datasets further comprises the step of associating model surfaces using the template model.

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16.   The method of claim 11, wherein the step of assigning landmarks further comprises the steps of:

      fitting, completely, a model to each dataset; and

      determining a point on each of a plurality of surfaces of the model which is closest to each of a plurality of nodes of the template model.

17.   The method of claim 16, wherein the nodes are points wherein at least three polygons comprising the template model meet.

18.   The method of claim 11, wherein averaging the landmarks further comprise the steps of:

      determining a confidence of each landmark;

      scoring each confidence; and

      averaging the landmarks according to a membership function of a scored value of the corresponding confidences.

19.   The method of claim 11, wherein the statistical model is determined according to a principle component analysis.